

Introductory GIS Terminology

address-matching/ geocoding - method of creating geographic data files or interpolating locations by relating street addresses to point locations or areas such as census blocks, zip codes, or other administrative units.

attribute - non-graphic information associated with an element in a geographic information system (GIS) depiction or map.

buffer - an area which is created at a specified distance from a selected map feature. It is usually used in overlay spatial analysis.

Cartesian coordinate system - positions of features on the earth's surface are referenced as XY coordinates.

cell - the basic element of spatial information in the raster (grid) description of spatial entities.

contour - a line connecting points of equal surface value.

database - a collection of interrelated information, usually stored on some form of mass-storage system such as magnetic tape or disk.

digital elevation model (DEM) - representation of the earth's surface for a geographic area stored in a digital file containing regularly spaced point locations with an elevation attribute.

digitizing - a method by which map sources are converted to a digital geographic file by literally tracing the map features with a digitizing tablet or mouse. The coordinates of the features are converted by the electronics of the digitizing system to produce their locations in the new file.

dissolve - the process of removing boundaries between adjacent polygons that have the same values for a specified attribute.

FIPS - The Federal Information Processing Standards or FIPS is a US government standardized state and country identification system approved for us by government agencies. FIPS also refers to a wide range of computer system elements, many of which are related to GISs, such as hardware, storage media, data files, codes, interfaces, data transmission, networking, data management, documentation, programming languages, software engineering, performance, security, and so forth.

georeference - To establish the relationship between page coordinates on a planar map and known real-world coordinates.

geographic information system (GIS) - an organized collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information.

global positioning system (GPS) - the satellite-based navigational system that allows one to pinpoint their location on the earth.

interpolate - to estimate the value of an attribute at an unsampled point from measurements made at surrounding sites.

isoline - a line on a surface connecting points of equal value.

layer - a thematic set of spatial data. Layers organize a database or map by subject matter (e.g., soils, roads, and wells).

meta-data - information about data found in a special type of database or text file known as the data dictionary which describes the content and structure of a data set. Meta-data usually includes information about currency, accuracy, collection methodology, and extent.

overlay - process of spatial analysis by comparing spatial elements of one data layer with elements of others so that any position within the extent of these areas can be described within the terms of these layers.

raster data structure - a data structure model in which spatial features are stored and represented as a graphic image subdivided into uniform grid cells.

relational database - a database using a relational data model which stores information in a way which allows each field to be used as a key to sort and query on to manipulate, update, and link to other databases.

remote sensing - the process of using an instrument to detect and record information from a distance.

resolution - the size of the picture elements or pixels of which the image is composed.

spatial analysis - the process of modeling, examining, and interpreting model results. Spatial analysis is useful for evaluating suitability and capability, for estimating and predicting, and for interpreting and understanding. There are four traditional types of spatial analysis: topological overlay and contiguity analysis, surface analysis, linear analysis, and raster analysis.

spatial autocorrelation - indicates the degree to which the distribution of a spatial phenomenon is influenced by relationships among cases of the phenomenon.

spatial filtering / smoothing - A technique used to remove or reduce local noise or high frequency signal within spatial data, and therefore reveal the global pattern or trend. Smoothing is a technique used in both spatial analysis and digital image processing using a variety of methods, but normally based upon a matrix or filter that passes over the image. Certain interpolation techniques, particularly the approximate interpolation methods, are also used to for smoothing images.

spatial regression - spatial modeling to explain the relationship between the variables of spatial phenomenon

surface - the representation of continuous features that cover an area and add a third dimension beyond X and Y. Surfaces are derived from irregularly spaced points. Common examples are elevation and temperature. **Surface analysis** of the distribution of a variable allows the variation of that variable to be estimated based on the values of known locations.

theme - refers to a data layer used in GIS software. Some common examples are shape files, coverages, and surfaces.

TIGER - The Topologically Integrated Geographic Encoding and Referencing data format used by the U.S. Census Bureau to support census programs and surveys. It was used for the 1990 census. TIGER files contain street address ranges along lines and census tract/block boundaries. This descriptive data can be used to associate address information and census/demographic data with coverage features.

vector data structure - a data structure model in which spatial features are stored and represented as points, lines, and polygons.

GIS Resources

Books in Print:

The GIS Book: Understanding the Value and Implementation of GIS by George B. Korte

Exploring Spatial Analysis in GIS by Yue Hong Chou

Spatial Analysis: Modeling in a GIS Environment. Edited by Paul Longley and Michael Batty

GIS and Health by Anthony C. Gatrell

Commercial Information Sources:

GIS World and Business Geographics Buyers Guide <http://www.geoplace.com>

Geo Info Systems <http://www.geoinfosystems.com>

Software Web Sites:

AutoDesk World (GIS) <http://www.autodesk.com/gispower>

Idrisi (GIS) <http://www.clarklabs.org>

ARC/Info and ARCVIEW (GIS) <http://www.esri.com>
<http://www.esrviews.org.uk/links.htm>

GeoMedia (GIS) <http://www.intergraph.com/gis>

MapInfo (GIS) <http://www.mapinfo.com>

Imagine (image processing) <http://www.erdas.com>